laws of Nature, under which I include, not merely things and their forces, but men and their ways; and the fashioning of the affections and of the will into an earnest and living desire to move in harmony with those laws. For me education means neither more nor less than this. Anything which professes to call itself education must be tried by this standard, and if it fails to stand the test, I will not call it education, whatever may be the force of authority or of numbers on the other side.

This is how the question stands to-day, and it will be strange—not to say tragical—if it be not possible for the leaders of the nation, in view of the tremendous issues which lie before us, to devise the means of solving it without further delay so as to set up as "the ideal of a national educational system an organisation giving every single individual a chance to attain to a maximum of personal culture and social efficiency according to his natural gifts and the strength of his will."

Lord Cromer, in a speech following Lord Haldane's, remarked of Germany that "side by side with a great advance in national prosperity and scientific knowledge there had been a vast deterioration of character"; and he feared the same moral collapse for us "if not sufficient attention was paid to humanistic, particularly classical, education in this country." The association of science with crass materialism, and the suggestion that we must look to classical education to preserve our national character, are both presumptuous and misleading. Lord Cromer must know that until after the year 1900 the only way of access to the university in Germany was through the Gymnasium with a nine years' Latin course and a six years' Greek course. It would be more accurate, therefore, to seek the origins of the present war and of German barbarisms in classical education rather than in that of science. The diplomatists and statesmen who are responsible for the war have, almost without exception, been trained on classical lines; and they have called in the aid of forces provided by science, which must, however, not be made responsible for the ignoble uses to which its knowledge is put. Men who have had a scientific education have answered their country's call, and made the supreme sacrifice, just as readily as those trained in classical schools. To suggest that the British nature and the noblest characteristics of "an English gentleman" must have the flimsy classical teaching of public schools to cultivate them is a fallacy which will not bear a moment's serious consideration.

Lord Cromer's speech is just such a one as might have been made in support of Latin as a humanising influence, when, at the Renaissance, the humanists of that time were urging the introduction of Greek into the curriculum. In those days the humanists were on the side of the new learning, but now they range themselves against it, forgetting that education must take account of the demands and tendencies of the day. When placing utilitarianism in contrast with literary studies, and science against spirituality, it should be borne in mind by advocates of established methods that, at the time when the foundations of classical education were laid, Latin and Greek had a very definite utilitarian object—one as the international language of the learned, the other as the storehouse of mathematical and scientific knowledge.

The time is ripe for a great and fundamental change in our methods and means of education. Modern needs demand not only that science and scientific training should be given their rightful and due place in the curricula of all grades of schools and in the universities, but also the abolition of all restrictions which prevent the children of the nation from the enjoyment of school-life until fourteen years of age. Part-time instruction should be arranged within the normal hours of labour for those who have left school until the end of the seventeenth year at least, and, lastly, the status and rewards of the teacher should be raised and made more attractive. The Promised Land is in sight, and must be won. It lies with our statesmen to give effect to these imperative claims and so provide for the best development of the Empire.

THEORY OF CALCULATION.

Theory of Measurements: a Manual for Physics Students. By Prof. J. S. Stephens. Pp. vii + 81. (London: Constable and Co., Ltd., 1915.) Price 6*s.* net.

A NATURAL but erroneous impression produced by the title of this book, "Theory of Measurements: a Manual for Physics Students," is that it has to do with apparatus such as is found in a physical laboratory; but actually, while occasionally some piece of apparatus is just mentioned, the book has but little to do with physical apparatus or its use. Measurements are supposed already to have been made, and then the "theory of measurements" comes in, and considerations of accuracy, probability, least squares, and scientific juggling generally are set before the reader. It is difficult to say that they are explained; they are stated.

After a short introductory chapter, in which the extreme accuracy of wave-length observations are referred to and contrasted with a crude determination of g by means of an extemporised simple pendulum, with the view apparently of giving some idea of the use of significant figures, the author discusses in the next chapter the theory

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of probabilities, the weighting of observations, and the treatment of the figures obtained, but illustrations are deferred until after the chapter on the precision of observations. Some interesting subjects for discussion are appended. The last relates to gambling, and the views of Dr. Burnham, of Chicago, are quoted, who believed that if the laws of chance were taught to children in the schools, they would steer clear of the slot machine in early years, and later would shun the bookmaker and every other gambling magnate. Now, would they? Might not they, even though they had been taught that the value of the chance was only halt what they were paying, come to that other conclusion—natural if they have imperfectly understood what they were taught—that the laws of chance are "all theory like the stars," and that with luck they might easily win a big prize?

The third chapter is on "the adjustment of observations, ' and here we find more pains taken to explain how observations in general and observations that are not exactly consistent in particular should be dealt with to obtain the best or most likely results.

In the chapter on "the precision of observations" the probability curve is treated graphically, and mean square error, average deviation, and probable error are explained. The next chapter, on the propagation of errors, perhaps most nearly touches the experimental work of the student, for here the relation of error of observation to error of result is discussed. After this, plotting and negligibility are the subjects of two chapters, in the latter of which the slide rule is taken as an example. The concluding chapter is on empirical formulæ and constants.

It will be seen from the tabular statement of the subjects considered that they are of the first importance to the experimentalist. At the same time, unless the student is made to appreciate well both the niceties of the experimental art and the matters dealt with in this book, the latter may, if imperfectly understood, be a source of danger. The student may not appreciate the futility of overloading a multitude of bad observations, subject of necessity to consistent errors, with sheets of least square calculations. If he has more aptitude for figures than for experiment, he may even delude himself into believing that his calculated probable errors really are probable errors. In such cases it is much more important to spend the time required for these calculations in improving his apparatus or varying his method so as, so far as possible, to avoid consistent errors. Two or three experiments really well conducted are worth far more than a multitude performed in a slovenly way, and no scientific juggling will give the multitude more value. The writer feels that this aspect of the general question is not sufficiently insisted on, and the book, in spite of its many excellent features, would be more valuable to the student if the author had condescended to give more attention to the actual operations of the laboratory and their relation to the consequent calculations. C. V. BOYS.

"SPOTTED FEVER."

Cerebro-spinal Fever. By Dr. Michael Foster and Dr. J. F. Gaskell. Pp. x+222. (Cambridge: At the University Press, 1916.) Price 12*s.* 6*d.* net.

THIS excellent and complete monograph of the much-dreaded disease, cerebro-spinal fever—dreaded because of its high mortality and incapacitating sequelæ—should prove of great interest not only to the members of the medical profession but to men of science generally.

The book is dedicated by the authors to the memory of their respective fathers, and on account of its careful, lucid, scientific, yet withal practical, exposition of the subject it is a worthy tribute to those two great founders of the modern school of English physiology.

The authors claim that this monograph has for its aim an attempt to bring together and correlate the clinical and pathological facts which they were enabled to accumulate during the epidemic of 1915 in the Eastern Command, and the views set forth are the outcome of clinical and pathological observations made in the wards, the laboratory, and the post-mortem room of the 1st Eastern General Hospital.

There are eleven chapters and two appendices, and the excellent plan of giving a summary in italics of the principal facts dealt with in each chapter is helpful to the reader. There are eleven excellent plates, eight of which are coloured. The work commences with an interesting historical account of the disease—largely a summary from the exhaustive treatise by Hirsch on Geographical and Historical Pathology. The first authentic account of an epidemic is that which occurred in Geneva in 1805. From the date of this, its first appearance, the disease was epidemic at various places both in Europe and America. Read in the light of modern knowlege of carriers in the propagation of disease, we can understand how this disease suddenly appeared and travelled according to no appreciable law.

Prior to 1915 cerebro-spinal fever in an epidemic form had been confined in Great Britain to the industrial centres of Scotland and Ireland. The authors point out that although the naso-pharynx is the location in which the specific organism is to be found, yet, according to their experience, it may be present without causing any marked inflammatory condition of the mucous membrane. Consequently, carriers may appear to be healthy persons; and it is not surprising, therefore, that when, in 1915, large numbers of soldiers were crowded into huts and billets with deficient ventilation and other favouring conditions, outbreaks of the disease should have occurred not only among the soldiers but also among civilians. Serious epidemics occurred at Salisbury Plain, Aldershot, in the London area, and in the eastern counties of England. A good account of the symptomatology, diagnosis, and treatment of the disease is given. Four excellent coloured plates illustrate the four distinct varieties of rash, and

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